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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/636,000	08/09/2000	Stephen P. Pope	20669-000300US	5413
23363	7590	02/22/2005	EXAMINER	
CHRISTIE, PARKER & HALE, LLP			BURD, KEVIN MICHAEL	
PO BOX 7068			ART UNIT	
PASADENA, CA 91109-7068			PAPER NUMBER	
			2631	

DATE MAILED: 02/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No. **AK**

09/636,000

Applicant(s)

POPE, STEPHEN P.

Examiner

Kevin M. Burd

Art Unit

2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on 18 October 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-12 and 17-21 is/are rejected.
- 7) ☒ Claim(s) 6 and 13-16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

1. This office action, in response to the amendment and remarks filed 10/18/2004, is a non-final office action.

***Response to Arguments***

2. The previous rejection of Applicant's claim for domestic priority is maintained and restated below.
3. An additional rejection of claims 1, 8-12 and 17-21 under 35 USC 102(f) is stated below. The inventors stated in the provisional application 60/147,506 are not listed as inventors of the instant application. In addition, a rejection of claims 1, 8-12 and 17-21 under 35 USC 101 is also stated below. The allowability of these claims is withdrawn in view of these new rejections.

Applicant's arguments filed 10/18/2004 have been fully considered but they are not persuasive. Cesari discloses generating a branch metric according to an auto correlation of the impulse response of a channel as stated in column 9, lines 4-21. The combination of Cesari and Beat disclose using a Grey code for computing branch metric parameters. Beat discloses a method of changing one binary sequence to another binary sequence by changing only one bit of that sequence using a Gray code (column 2, lines 22-33). This results from adding or subtracting one bit from a prior state of the branch metric to compute the next state. For this reason, the rejections of claims 1-5, 7, 11 and 12 are maintained and stated below.

***Priority***

4. Applicant's claim for domestic priority under 35 U.S.C. 119(e) is acknowledged. However, the provisional application upon which priority is claimed fails to provide adequate support since the provisional and the nonprovisional application do not have at least one inventor in common. The Inventor of the nonprovisional application is Stephen Pope while the inventors of the provisional application are Aki Shohara and Yue Chen. 37 CFR 1.48(e) discloses "Under 35 U.S.C. 119(e), as contained in Public Law 103-465, a later filed nonprovisional application under 35 U.S.C. 111(a) that is filed within twelve months of an earlier provisional application may claim priority benefits based on the earlier filed provisional application so long as both applications have at least one inventor in common. An error in not naming or in naming a person as an inventor in a provisional application would not require correction under either 37 CFR 1.48(d) (to add an inventor) or 37 CFR 1.48(e) (to delete an inventor) in the provisional application so long as the nonprovisional application naming the correct inventorship would contain an overlap of at least one inventor with the provisional application. The existence of inventorship overlap would prevent the original inventorship error from having any effect upon the ability of the provisional application to serve as a basis for a priority claim under 35 U.S.C. 119(e) with the U.S. Patent and Trademark Office. If, however, applicant chooses to correct the inventive entity of a provisional application, for example, to permit the provisional application to serve as the basis of a priority claim in a foreign country, 37 CFR 1.48(d) and (e) set forth the procedures for adding one or more actual inventors and for deleting one or more erroneously named inventors

respectively. In the situation where an inventor was not named in a provisional application and an inventor was also erroneously named in the same provisional application and correction is desired, a request under 37 CFR 1.48(d) and a request under 37 CFR 1.48(e) would be required. Where an inventorship error in a provisional application is desired to be corrected after expiration of twelve months from the filing date of the provisional application, a request under 37 CFR 1.48(d) and/or 37 CFR 1.48(e) may still be filed with OIPE, which handles requests under 37 CFR 1.48(d) and (e), to correct the inventorship in provisional applications.”

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. It appears that the provisional application 60/147,506 discloses the invention stated in claims 1, 8-12 and 17-21. The inventors stated in the provisional are different than the inventors list in the instant application.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(f) he did not himself invent the subject matter sought to be patented.

6. Claims 1, 8-12 and 17-21 are rejected under 35 U.S.C. 102(f) because the applicant did not invent the claimed subject matter. Provisional application 60/147,506 lists named inventors Yue Chen of Santa Clara, CA and Aki Shohara of Sunnyvale, CA. Both appear have been employed by Broadcom Corporation in 8/1999 (time of filing of the provisional application). The instant application lists named inventor Stephen Pope of Berkeley, CA and the assignment of this application is Broadcom Corporation.

Regarding claims 1 and 11, the provisional application discloses a method of computing a maximum likelihood sequence estimate (title) in a dispersive communication channel (page 2). State transition information and values are input to the equalizer routine (figure 3). Means for calculating (page 14, second paragraph) and storing (page 14, first paragraph) the likelihood metrics and survivor bit of each state of the trellis is disclosed). The metrics are computed using a Gray coding which can be computed with a single addition for each occurrence (page 18). The final state on the maximum likelihood path in the trellis is determined (pages 11 and 12) and a backward trace is calculated through the trellis (page 14, third paragraph).

Regarding claims 2 and 12, the gray coding is used as stated above.

Regarding claim 8, the provisional application discloses a method of computing a maximum likelihood sequence estimate (title). An initial state and initial state mask are provided comprising a plurality of bits having either a first polarity or a second polarity (pages 21-22). A plurality of valid states is determined as shown in example 2 on page 22. An initial state is shown and don't care bits (xx) are substituted for bits from the initial state. The valid initial states are defined by either a one or a zero in the bit

position having a don't care, and the same bit as the initial state in the other positions (example 2 on page 22).

Regarding claim 9, the initial mask is derived at start up.

Regarding claim 10, the transmitter is compliant with the GPS mobile standard (page 4).

Regarding claims 17 and 18, the initial state and initial state mask are compared to determine differences between the two (page 22).

Regarding claims 19 and 20, the states are listed on page 21.

Regarding claim 21, a final state and final state mask are provided and valid states are computed (page 22).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3, 7, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cesari (US 5,844,947) in view of Beat (US 5,687,352).

Regarding claims 1 and 2, Cesari discloses a Viterbi decoder that calculates the most likely sequence to have been transmitted through a channel (column 4, lines 15-21). A plurality of data sources (branch metrics, prior states) relating to state transition probabilities is used as shown in figure 2. The surviving branch metric of the most likely

transition is stored forming the trellis of figure 2 (column 3, lines 64-66). The autocorrelation terms of a group of branch metrics are stored in registers (column 8, lines 63-66) and the branch metrics are calculated according to these terms (column 9, lines 13-16). The process is repeated for all symbol instants represented by the received data and traceback operations are also used (column 9, lines 21-25).

Cesari does not disclose computing the branch metric parameter calculations with a Gray code. Beat discloses a method of changing one binary sequence to another binary sequence by changing only one bit of that sequence using a Gray code (column 2, lines 22-33). By changing states of the binary sequence by changing only one bit on any one transition, components of the circuit are eliminated and the effective speed of the circuit is increased (column 2, lines 28-33). For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the method of changing transitions of Beat into the detector of Cesari.

Regarding claim 3, Cesari discloses the surviving branch metric of the most likely transition is stored forming the trellis of figure 2 (column 3, lines 64-66).

Regarding claim 7, Cesari discloses the path metrics are used to calculate soft metrics (column 11, lines 34-40).

Regarding claims 11 and 12, Cesari discloses a Viterbi decoder that calculates the most likely sequence to have been transmitted through a channel (column 4, lines 15-21). A plurality of data sources (branch metrics, prior states) relating to state transition probabilities is used as shown in figure 2. The surviving branch metric of the most likely transition is stored forming the trellis of figure 2 (column 3, lines 64-66).



Cesari does not disclose computing the branch metric parameter calculations with a Gray code. Beat discloses a method of changing one binary sequence to another binary sequence by changing only one bit of that sequence using a Gray code (column 2, lines 22-33). By changing states of the binary sequence by changing only one bit on any one transition, components of the circuit are eliminated and the effective speed of the circuit is increased (column 2, lines 28-33). For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the method of changing transitions of Beat into the detector of Cesari.

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cesari (US 5,844,947) in view of Beat (US 5,687,352) further in view of Murakami (US 5,440,588).

Regarding claim 4, the combination of Cesari and Beat disclose the detector stated above in paragraph 6. The combination does not disclose the branch metric parameters are calculated in real time. Murakami discloses conventional maximum likelihood sequence estimation uses a large amount of real time calculations to calculate the branch metrics and the final sequence (column 5, lines 14-56). Murakami further discloses a method of eliminating some of these real time calculations in the disclosure. It would have been obvious for one of ordinary skill in the art at the time of the invention to use the teachings of Murakami in the combination of Cesari and Beat. The use of real time calculations in calculating the branch metrics is a conventional method of calculating branch metrics and is beneficial since it eliminates the memory

used to store the pre-computed branch metric values. No memory is needed for these calculations in real time.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cesari (US 5,844,947) in view of Beat (US 5,687,352) further in view of Hladik et al (US 5,721,746).

Regarding claim 5, the combination of Cesari and Beat discloses the maximum likelihood sequence detector as stated above in paragraph 6. The combination does not disclose calculating "valid" initial states representing prior knowledge about the transmitted sequence for use in the decoder. Hladik discloses using prior information to calculate the probabilities of the initial starting states (column 7, lines 56-63). The information about the states is stored in registers (column 3, lines 8-17). These registers help to generate the "initial state masks". Any state with at least a probability of being the starting state must be used to insure the correct sequence is output and therefore is a "valid" starting state. These starting states will be the ones that are used. This is the "initialization of the trellis state metrics" since this is when the state states are computed. It would have been obvious for one of ordinary skill in the art at the time of the invention to utilize the teachings of Hladik in the decoder of Cesari and Beat to remove the starting states of the trellis that have no probability of being the initial starting state. To use these states would be a waste of resources.

***Allowable Subject Matter***

9. Claims 6 and 13-16 are allowed.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Burd whose telephone number is (571) 272-3008. The examiner can normally be reached on Monday - Thursday 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kevin M. Burd  
2/19/2005

**KEVIN BURD  
PRIMARY EXAMINER**